University of Windsor
Department of Electrical and Computer Engineering
ELEC 8590 Physical Design Automation for VLSI & FPGAs
Winter 2021

Programming Assignment #1:
Hypergraph Partitioning Tool Based on KL Algorithm

Due: Tuesday , March 2 , 2021, in class

Develop a hypergraph partitioning tool based on the Kernighan-Lin algorithm. The input to the tool will be a circuit netlist (**hypergraph ,** NOT a graph) and the output will be a bipartition of the hypergraph and relevant statistics (number of passes, final cut size, initial cut size, etc.). You should submit a brief written report describing the software you developed (main functions and data structures used), your testing strategy, any enhancements attempted or implemented, e.g. handling unbalanced partitions, speeding up KL algorithm, etc. Also, any type of graphical output illustrating the flow of algorithm is highly recommended (**but NOT required**). Use the approximations discussed in the class for handling hyperedges in the KL algorithm.

Test your partitioning tool on the 5 netlists posted on the course web site as text files. Note that each benchmark circuit is represented using **two files: *.nets* and *.nodes*.** The *.nodes* file lists all the nodes in the graph (*p* for I/Os and *a* for internal nodes). The *.nets* file lists all the nets that connect the nodes that make up the hypergraph to be partitioned.

You can use your laptop or workstations in the RCIM lab for developing this tool. Use C or C++ or Java or any other suitable programming language for program development.

Lastly, feel free to contact the instructor if you have any questions or clarifications about this programming assignment.

Good luck!